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TopCount® NXT™

Microplate Scintillation and Luminescence Counter

SPECIFICATIONS

STANDARD FEATURES

TopCount NXT is a fully contained benchtop microplate scintillation and luminescence counter, specially designed and configured for direct scintillation and luminescence counting of samples contained in microplates and microsample tubes. It is completely controlled by a built-in, IBM®-compatible Pentium® II computer (minimum), and operates under Windows NT® operating system. Several TopCount NXT models are available featuring:

- **Choice of models for simultaneous counting** of (a) two, six, or twelve samples in the standard 96-well format, (b) two or six samples in the VariPlate™ format for both 96-well and 24-well microplates, or (c) twelve samples in the TopCount NXT HTS VariPlate format for 96-well and 384-well microplates.
- **Automatic microplate stacker** accepts twenty plate and forty plate stacker cassettes. Twenty plate stacker cassettes accept twenty 384-well microplates, twenty 96-well microplates, or fifteen 24-well microplates. The forty plate stacker cassettes accept forty 384-well microplates, forty 96-well microplates, or thirty 24-well microplates. The stacker provides fully automatic loading, counting, unloading, and repeat cycle counting of sample plate batches. Microplates may be intermixed in the twenty or forty plate stacker cassettes in the VariPlate format TopCount NXT system configuration. 24-well microplates cannot be counted in the TopCount NXT HTS system. The external stacker cassettes permit loading and unloading of plates without interrupting sample counting. Two twenty plate or two forty plate stacker cassettes are required to complete a TopCount NXT system.
- **Patented TR-LSC® triple-mode counting technology** ensures optimum sensitivity for luminescence, liquid or solid scintillation counting. TopCount NXT is the only microplate counter available that can analyze luminescence samples with single photon counting, and liquid and solid scintillation samples with single PMT, time-resolved coincidence counting.
- **Optical crosstalk is prevented** in 24-well and 96-well opaque microplates by the use of reflective optics and patented single photomultiplier tube technology. This technology allows the use of opaque plates which prevent light transmission between wells. The small amount of well-to-well crosstalk in the 384-well microplate, which is caused by the extremely thin well walls, is corrected by proprietary crosstalk correction software.
- **Isothermal counting chamber** maintains constant counting temperature for all assays. This eliminates electronic drift and assures reproducible counting conditions for even the most temperature sensitive luminescence reactions. User selectable from 19 to 35 °C. Temperature is constantly monitored with easily accessed digital temperature display.
- **Unison™ per assay, detector normalization** establishes optimum detector normalization (uniformity) for each assay regardless of signal type (solid or liquid scintillation, or luminescence), plate type or assay medium.



- **DPM calculations via tSIS**, or optional tSIE (external standard), gives both single label and dual label DPM, quench curve storage, on-screen quench curve editing, and quench curve printing.
- **Built-in, IBM-compatible, 350 MHz Pentium II computer** with a minimum of 64MB of RAM (128 MB in models 384V and 9912), one 3.5 inch 1.44 MB floppy drive, 4.3 GB hard drive, CDROM drive, RS-232 input/output port, parallel printer port, Windows NT operating system, enhanced function keyboard in a pull-out drawer, SVGA color CRT monitor and mouse.
- **Windows NT with true 32 bit multi-tasking capability** allows microplate counting to run simultaneously with other Windows, or DOS-based applications.
- **Hologram ODBC built-in database** provides automatic storage of all sample counts. This protects data against printer and network failures, and provides user-selectable data recall by plate I.D., assay number or date for printing and ASCII file transmission.
- **Two simultaneous counting regions** with factory preset and operator adjustable counting regions. Provides single and dual label counts, CPM results, and single label DPM using the tSIS quench parameter.
- **Counts ^{3}H, ^{125}I, ^{14}C, ^{35}S, ^{45}Ca, ^{51}Cr, ^{33}P and ^{32}P**, as well as other commonly used beta and gamma nuclides.
- **Automatic bar code label reader provides positive sample identification** by reading both the assay number and sample plate number on bar code labels which are attached directly to the sample plate. Sample plate bar codes may contain up to eight alphanumeric characters. The instrument can use the bar code to create separate file names for each plate.

Packard Instrument Company 800 Research Parkway, Meriden, Connecticut 06450
Telephone: 203-238-2351/1-800-323-1891 FAX: 203-639-2172 Customer Support: 1-800-445-7426
Web Site: http://www.packardinstrument.com E-mail: webmaster@packardinstrument.com

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M2724 SS4001-TC 8/99 Printed in U.S.A.

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- **Unattended, automatic, spreadsheet analysis of count data to final results** without exporting data to external storage devices or computers. Provides automatic, assay-specific data processing for all user applications, including commercial or user-customized software, when user provides macros.
- **Customized data outputs** for raw counts, CPM, DPM, single and dual label, screening, and elapsed time. Spreadsheet-type data output formatting provides individualized data output to simplify results reporting. Also provides automatic data transfer via networks.
- **Data archiving** for subsequent processing. Data can be saved in ASCII, Lotus® or Excel® compatible file formats.
- **Results analysis and re-analysis** features enable recall; display and reprinting of previously counted sample data; re-mapping/reprocessing; and tagging of screened data including summaries of hits for specified screening levels.
- **User-selectable repeat counting of wells, plates and assays** ensures versatility for conducting virtually any time-based assays. Wells and plates are counted for the required number of repeats while remaining in the light-tight counting chamber.
- **Multi-user/multi-assay sample processing with 100 user/assay definitions, and assay definition overwrite protection.** Assays may be completely customized for individual application requirements.
- **Real time, microplate format display** of sample counts, CPM, tSIS or tSIE with external standard option present, 2 Sigma error, and sample map with sample type. The microplate display is adjustable to show full or partial plates in 24-, 96- or 384-well formats.
- **User selectable printer output** provides columnar or microplate formatted printouts of raw data or processed sample results. Printouts may be obtained automatically for the current assay, or may be generated at any time for any data set stored in the built-in database.
- **Individualized output formatting to printer, and disk storage** for each assay provides flexibility in data reporting and transmission.
- **Context-specific Hypertext Help screens** provide instant help for virtually all screens and user selectable parameters. Help screen text may be edited or translated into local language.
- **On-line Reference Manual** supplements the on-line Help feature by providing detailed references for all instrument functions and applications.
- **Count termination via time or operator selected 2S % preset error.** Provides optimization of counting time and sample throughput.
- **User selectable precount delay** allows assay specific temperature and dark adapting for sensitive samples.
- **Automatic half-life correction to any time and date**, or to the beginning of the sample batch, to provide complete flexibility of sample batch referencing.
- **Nuclide library** contains factory preset and user customized nuclide parameter settings for immediate recall and use in user assays.
- **Automatic subtraction** of assay-specific background data. Individual backgrounds may be stored for any plate type, cocktail type, or nuclide set-up conditions.
- **On-screen, random-access editing** of assay definitions facilitates simple and fast assay set-up and changes.
- **On-screen plate mapping** lets the user specify the sample type and location of each sample within the sample plate for blank subtraction; quenched standard counting and storage; replicate averaging; and normalization.
- **Scintillation Proximity Assays** may be counted in OptiPlates™, with up to 80 µL total sample volume in the 384-well plates, 350 µL in the 96-well plates, and 1.8 mL in the 24-well plates. SPA is available from Amersham®.
- **Liquid scintillation counting** of samples in solvent resistant PicoPlates™ or white polystyrene microplates using environmentally benign cocktails for organic and aqueous samples. Combined sample and cocktail volumes of up to 350 µL may be counted in the 96-well format PicoPlates and OptiPlates and a combined sample and cocktail volume of up to 80 µL may be used in 384-well microplates, depending on the style of the microplate. Combined sample and cocktail volumes of up to 1.8 mL may be counted in the 24-well format PicoPlates or OptiPlates.
- **Dry scintillation counting** is performed in Packard's unique LumaPlate™ solid scintillator plates. Up to 60 µL of non-volatile sample may be counted in the 96-well format. Up to 350 µL can be counted in the deep well LumaPlate-96 or the 24-well LumaPlate.
- **Luminescence measurements** can be simultaneously performed on two wells with standard TopCount NXT configurations. Six and twelve well luminescence measurement options are also available (see options). Glow luminescent labels and bioluminescence reactions can be counted with a dynamic range of 10^6.
- **Filtration assays using UniFilter® plates** allow harvesting and counting of the sample microplate with no filter handling. Cell proliferation and receptor binding can be performed in UniFilter-96 or -24 plates with integral Whatman® GF/C™ or GF/B™ filters.
- **OmniFilter™ plates can be used for any filter** membrane or ion exchange paper for radioisotopic or luminescent counting in the 96-well format.
- **Direct analysis of adherent cells** grown in sterile, tissue culture treated CulturPlates™ or ViewPlates™. CulturPlates are white polystyrene plates manufactured by Nunc®. ViewPlates have a transparent bottom for the microscopic examination of cell growth and morphology. Regardless of the plate selected, the cells are grown and counted in the same plate. There are no cell harvesting steps.
- **Compatibility with 96-well, white microplates from other companies** such as Nunc, Dynex® (Microlite® and MicroFLUOR®), Millipore® (MultiScreen®), and Costar® expands

the capabilities of TopCount NXT.

- **FlashPlates®** offer convenience for in-plate binding assays in 96- and 384-well formats. A layer of styrene scintillator allows bound radioactivity to be counted without the addition of cocktail. FlashPlates are available from NEN® Life Science Products with a variety of coatings including streptavidin and antibodies.
- **Robot-compatible operation, or stand-alone use** is facilitated by the easy access front loading sample plate changer which accepts the 16 x 24, 8 x 12 or 4 x 6 microplate formats. The sample plate loader responds to front panel, TopCount NXT system software commands, or software commands from external robotic devices. A menu selection converts from robotic to manual operation with stackers.
- **Inkjet printer** with IBM-compatible parallel interface.
- **Automatic power-fail recovery** restarts counting when power is restored and the instrument has reinitialized itself.
- **Anti-jam recovery and protection** of the sample plate changer mechanism to protect sample plates and the counting system from damage if obstructions occur.
- **Computer-aided diagnostics** are used to test and verify all system functions.
- **Date and time clock** provides real time display and time-stamped printouts; battery supported.

OPTIONS

- **Six well, six detector luminescence measurement** option provides simultaneous luminescence counting measurements for six wells in 96-well microplates.
- **Twelve well, twelve detector luminescence measurement** option provides simultaneous luminescence counting measurements for twelve wells in either 96- or 384 well microplates.
- **Single plate stacker** for use with externally controlled robotic plate loading/unloading.
- **Automatic, Low Energy External Standard Source (^{133}Ba) and Transformed Spectral Index calculation (tSIE)** for volume and sample nuclide independent determination of sample quench. Measures quench in two samples simultaneously. This feature is available on VariPlate models for use with 24-well plates.
- **IPA (Instrument Performance Assessment) software** allows the operator to verify the proper function of all important operating parameters of the TopCount NXT. Detector alignment, photomultiplier tube performance, and background are among the parameters checked to ensure accurate results.
- **Laser printer** with IBM-compatible parallel interface**.**
- **17 inch SVGA Color CRT Monitor.**
- **Instrument cart** is a functionally designed laboratory cart, which houses the isothermal cooling system and accessories and makes the TopCount NXT system a space-saving, mobile unit.

ACCESSORIES AND CONSUMABLES

- **The FilterMate™ harvester** is designed for harvesting on UniFilter-96 or -24 filter plates. The harvester can be easily converted between the 96- and 24-well microplate format for maximum harvester versatility.
- **PicoPlate-96:** 96-well plates for solvent resistance.
- **PicoPlate-24:** 24-well plates for solvent resistance.
- **LumaPlate-96:** 96-well solid scintillator-coated plates.
- **Deep Well LumaPlate-96:** 96-well solid scintillator-coated plates for larger samples.
- **OptiPlate-384:** 384-well white polystyrene plates.
- **OptiPlate-96:** 96-well white polystyrene plates.
- **OptiPlate-24:** 24-well white polystyrene plates.
- **UniFilter-96:** 96-well filter plates with GF/C or GF/B filters.
- **UniFilter-24:** 24-well filter plates with GF/B filters.
- **OmniFilter-96** for counting radioactive and luminescent samples on any filter or membrane.
- **EasyTab-C** self-aligning filtermats for use with the FilterMate harvester and the OmniFilter holders.
- **CulturPlate-96:** 96-well white polystyrene plates; tissue culture treated; sterile; with lids; individually wrapped.
- **CulturPlate-24:** 24-well white polystyrene plates; tissue culture treated; sterile; with lids; individually wrapped.
- **ViewPlate-96:** 96-well white or black polystyrene plates; clear-bottom; tissue culture treated; sterile; with lids; individually wrapped for microscopic examination of cells.
- **MultiScreen® adaptors** for counting Millipore's 96-well MutliScreen plates.
- **MicroMate™ 496 microplate heat sealer** provides a positive cover film-to-plate seal without the use of solvent-labile adhesives.
- **LucLite™ and LucLite™ Plus luciferase reporter gene assay kits** provide a long-lived, “glow”-type luminescence signal for high throughput applications. Homogeneous assays can be performed from start to finish in a single microplate.
- **CytoLite™ luminescent cell proliferation assay kit** provides a long-lived “glow” type luminescence signal for cell proliferation and cytotoxicity assays.
- **ATPLite™-M for ATP measurements without injectors** provides high sensitivity and a dynamic range of 10 cells to over 100,000 cells/well.

- **OptiPlate HTRF-96:** 96-well black plates for low background, high sensitivity luminescence analysis.
- **Bar coded protocol labels,** 60 labels per sheet. Each TopCount NXT system is supplied with 30 sheets of labels for assays 1-30. Additional assay label sets are available for assays 1-30, and 31-60, and 61-00, in sets of 30 sheets with 60 labels per sheet.
- **Bar coded microplate identification labels,** 80 labels per sheet. Each TopCount NXT system is supplied with microplate I.D. labels numbered 1-2,000 in a set of 25 sheets. Additional microplate I.D. labels are available in sets of 25 sheets for numbers 1-2,000.
- **TopSeal™-P Microplate Sealing Film** for heat sealing PicoPlates, UniFilters, and LumaPlates.
- **TopSeal™-S Microplate Sealing Film** for heat sealing any microplates which are compatible with TopCount NXT.
- **TopSeal™-A Microplate Sealing Film** for a press-on adhesive seal with any microplate.
- **SignalScreen™ products are membrane preparations** of pharmacologically characterized recombinant GPCR (G protein-coupled receptors) expressed in mammalian or insect cells for radioligand binding and/or functional assays.
- **ScreenReady™ targets consist of cell membrane preparations** containing G protein-coupled receptors pre-coated onto 96- and 384- well FlashPlate™ microplates.
- **CytoScreen™ products are live mammalian cell lines** expressing G protein-coupled receptors and baculovirus reagents expressing cloned receptors, G protein subunits, regulators of G protein signaling and signal transduction enzymes.

COCKTAILS

- **MicroScint™-40** aqueous, high capacity cocktail maximizes load capacity and provides high counting efficiency.
- **MicroScint™-20** aqueous, high sensitivity cocktail provides the highest aqueous sample counting efficiency for micro samples
- **MicroScint™-E** cocktail for direct, *in situ* extraction of lipids from aqueous samples in microplates.
- **MicroScint™-O** organic cocktail for non-polar and organic samples, and for counting dried samples and filtrates.
- **MicroScint™-PS** low viscosity, aqueous cocktail formulated primarily for prolonged use with polystyrene microplates.

PHYSICAL DATA

Dimensions:
Height: 20 inch (50.8 cm)
Width: 37 inch (94.0 cm)
Depth: 25 inch (63.5 cm)

Weight:
200 lbs (91 kg) without AES and cart
280 lbs (127 kg) with AES and without cart

Electrical requirements:
117 Vac ± 10% 50/60 Hz 4.0 Amp protection
220 Vac ± 15% 50/60 Hz 3.0 Amp protection
Power consumption: 350 VA maximum, instrument only

Isothermal cooling electrical requirements:
117 Vac ± 10% 50/60 Hz 8.0 Amp protection
220 Vac ± 15% 50/60 Hz 5.0 Amp protection
Power consumption: 940 VA maximum

Environmental requirements:
Operating ambient temperature 15 to 35 °C (59 to 90 °F)
Operating relative humidity 30% to 85%

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Scintillation Proximity Assay Technology is covered by US patent number 4568649, European patent number 0154734, and Japanese patent application number 84/52452, Nycomed Amersham plc.
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Packard
A Packard BioScience Company

Packard Instrument Company
800 Research Parkway
Meriden, CT 06450 U.S.A.
Tel: 203-238-2351
Toll Free: 1-800-323-1891
Customer Support: 1-800-445-7426
FAX: 203-639-2172
Web Site: http://www.packardinstrument.com
E-mail: webmaster@packardinstrument.com

Packard International Offices:
Australia 03-9543-4266 or 1 800 335 638;
Austria 43-1-2702504; **Belgium** 32(0)2/481.85.30;
Canada 1-800-387-9559; **Central Europe** 43 456 2230 015;
Denmark 45-43909023 or 45-43907151;
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